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X-Band RF Structure Fabrication at Fermilab

T. Arkan, C. Boffo, E. Borissov, H. Carter, D. Finley, I. Gonin, T. Khabiboulline, S. Mishra, G. Romanov, N. Solyak, Fermilab, P.O. Box 500, Batavia, IL 60510, USA

The RF Technology Development group at Fermilab is working together with the NLC and GLC groups at SLAC and KEK on developing technology for room temperature X-band accelerating structures for a future linear collider. This paper describes the RF structure factory infrastructure (clean rooms, vacuum furnaces, vacuum equipment, RF equipment etc.), and the fabrication techniques utilized (the machining of copper cells / couplers, quality control, etching, vacuum brazing, cleanliness requirements etc.) for the production of FXB and FXC / FXD structures.

- Structure production factory built up in 2-1/2 years from concept to a facility with a production rate of 2 structures per month
- Semi-industrial approach---All parts made in local industry using conventional precision machining with final assembly at Fermilab
- Excellent results achieved in reproducibility of single cells as well as flat field and phase profiles for entire structures
- Structure cell-to-cell alignment and overall straightness routinely meets or exceeds mechanical requirements for NLC structures

Fabrication Process Flow

Parts Preparation for Assembly

Parts Acquisition

Quality Control (Mechanical and/or Low Power RF Testing)

Visual Inspection / Hand Deburring (if needed)

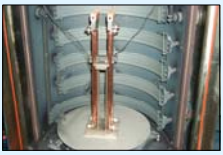
Degreasing & Etching of parts

Disks 1000ºC Bake

Sub-Assembly Production

Traveler (process engineering)

Coupler Sub-Assembly Production



Water Tubes Sub-Assembly Production

Structure Final Assembly

Disk Stack Brazing

Couplers to Disk Stack Brazing

Bead-Pull & Tuning

Final Brazing

Final 72 hrs. vacuum bake

Installation on Strongback

Crate & Ship